

Claims

What is claimed is:

1. In a disc drive having a plurality of tracks and a magneto resistive (MR) head positioned above the tracks to access magnetic information stored on the tracks and a thermal asperity detector circuit operably connected to the MR head, a method of detecting and measuring instability within the MR head comprising steps of:
  - setting a threshold in the thermal asperity detector operably connected to the MR head;
  - 10 applying a read bias to the MR head;
  - reading a signal emanating from the MR head positioned over an erased track;
  - counting a number of occurrences of signals that exceed the threshold; and
  - determining transducer magnetic instability for the MR head based on the number of occurrences of signals that exceed the threshold.
- 15 2. The method in claim 1, further comprising:
  - adjusting the read bias to a new value within a range of values, the range of values based on a characteristic of the MR head; and
  - repeating the steps of reading, counting, and determining.
- 20 3. The method in claim 2, further comprising:
  - re-setting the thermal asperity detector to a new threshold; and
  - repeating the steps of reading, counting, and determining.
- 25 4. The method in claim 3 further comprising:
  - realigning magnetic domains within the MR head if the number of signal occurrences exceeds a pre-determined number.
- 30 5. A computer readable medium having computer-executable instructions for performing the steps recited in claim 4.

6. A method for detecting transducer magnetic instability in a magneto-resistive (MR) head in an operating disc drive, the method comprising steps of:  
setting a signal threshold in a thermal asperity detector in a disc drive read channel circuit;  
5 setting a read bias in the read channel circuit;  
reading an erased track on a disc in the drive to detect a signal emanating from the MR head; and  
counting an occurrence of the signal if the signal exceeds the signal threshold.
- 10 7. The method in claim 6, further comprising:  
re-setting the read bias to a new bias; and  
repeating the reading and counting steps.
- 15 8. The method in claim 7, further comprising:  
performing the re-setting and repeating steps for a pre-determined number of repetitions.
- 20 9. The method in claim 7, further comprising:  
performing the re-setting and repeating steps until there are no occurrences of signals that exceed the threshold.
10. The method in claim 8, wherein the pre-determined number of repetitions is five (5).
- 25 11. The method in claim 8, further comprising:  
re-setting the signal threshold to a new signal threshold; and  
repeating the setting of a read bias, the reading on a erased track, and the counting of signal occurrences.
- 30 12. The method in claim 11, further comprising:  
repeating the re-setting of the signal threshold for a pre-determined number of repetitions.

- 5 13. The method in claim 12, further comprising:  
setting a first criterion based on a characteristic of the MR head;  
comparing the counted number of occurrences of the signals that exceed the  
threshold to the first criterion to determine a reliability value to the MR head.
- 10 14. The method in claim 13, further comprising:  
rejecting the MR head if the reliability value is outside a second criterion.
- 15 15. The method in claim 13, further comprising:  
re-aligning magnetic domains within the MR head based on the reliability value.
- 15 16. The method in claim 6, further comprising:  
attenuating the signal emanating from the MR head to a level within a range of  
pre-determined signal thresholds.
- 20 17. The method in claim 6, further comprising:  
amplifying the signal emanating from the MR head to a level within a range of  
pre-determined signal thresholds.
18. A computer readable medium having computer-executable instructions for  
performing the steps recited in claim 8.
- 25 19. A computer readable medium having computer-executable instructions for  
performing the steps recited in claim 11.
20. A computer readable medium having computer-executable instructions for  
performing the steps recited in claim 13.

21. An apparatus for detecting and measuring instability in a magneto-resistive (MR) head in an operating disc drive, the MR head having a magnetic orientation and positioned over a pre-determined track on a disc in the drive, the apparatus comprising:

5 a thermal asperity detector circuit in a read channel of the disc drive operably connected to the MR head, the thermal asperity detector having an adjustable threshold set to a pre-determined value; and

a means for utilizing the thermal asperity detector circuit to determine magnetic instability.

10 22. The apparatus in claim 21, further comprising:

a read bias applied to the MR head, the bias selected from a range of values, the values based on the MR head resistance to a magnetic field; and

a signal generated by the MR head, the MR head positioned over an erased track.

15 23. The apparatus of claim 22 wherein the apparatus further comprises:

a means for adjusting the bias to re-orient the magnetic domains within the MR head based on the number of occurrences of signals exceeding the pre-determined threshold value.

20 24. The apparatus in claim 21, further comprising:

a software module operably connected to the thermal asperity detector comparing a signal from the MR head to the pre-determined threshold, the MR head positioned over an erased track, the software module counting occurrences in which the signal exceeds the pre-determined threshold value.

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25. The apparatus in claim 21, further comprising:

a means for generating a signal by the MR head, the MR head positioned over an erased track; and

a means for comparing the signal to the pre-determined threshold, counting occurrences in which the signal exceeds the pre-determined threshold value.

26. The apparatus of claim 23 wherein the software module further comprises:  
a comparator operably connected to the read channel comparing the signal from  
the MR head to the pre-determined threshold value; and  
a counting unit operably connected to the comparator counting occurrences in  
5 which the signal exceeds the pre-determined threshold value.
27. The apparatus of claim 23 wherein the thermal asperity detector is  
operably connected to the MR head via a pre-amplifier and the software module is  
operably connected to the thermal asperity detector via the pre-amplifier.  
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28. The apparatus of claim 21 wherein the apparatus further comprises:  
a means for adjusting the signal emanating from the magneto-resistive head, the  
adjustment attenuating/amplifying the signal to a level within the range of settings for the  
threshold.  
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